THE USE OF A ROTOR-WINGED AIRCRAFT IN CONDUCTING NESTING SURVEYS OF OSPREYS IN NORTHERN IDAHO

by
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Abstract

Use of a helicopter to collect data on active nests, clutch sizes, hatching successes, and nestling counts of Ospreys nesting in northern Idaho are described. This method is economically practical, allows for the collection of nesting data over a large area in a short period of time, and enables researchers to collect data impossible to obtain by other methods. No adverse effects to the nesting success of this population were noted. Productivity levels were essentially equivalent to those of past years. Disturbance, reaction of adults, visibility of eggs and nestlings, costs, and validity of data are discussed. Recommendations are offered for future aerial surveys of nesting Ospreys.

Introduction

Lake Coeur d'Alene (130 km^2), Lake Pend Oreille (390 km^2), streams flowing in and out of the two lakes, and small adjacent lakes provide suitable habitat for a large Osprey (*Pandion haliaetus*) breeding population. Research efforts have continued since 1970 to identify the structure, size, and nesting success of this Osprey population (Schroeder 1972, Melquist 1974). Nesting data have been collected on 204 different pairs of Ospreys within the study area. Nesting surveys were conducted on foot, with vehicles, and by boat. Accessibility and observation of many nests were limited, often making data collection difficult and time consuming. Inspection of many of these nests was prohibited by their construction in dead or dying trees, most of which were unsafe to climb (fig. 1). As a result, clutch size and hatching success were determined for only a small number of nests. It is likely that an occasional nestling was not counted during the productivity survey because of the difficulty in observing certain nests. During the 1975 nesting season, we attempted to alleviate these problems, decrease the time factor involved in collecting data, and gain more inclusive data by using a rotary-winged aircraft (helicopter).

White and Sherrod (1973) reported on helicopter use for aerial surveys of raptors nesting on cliffs or hillsides in open terrain, but not of tree-nesting species. This paper describes the use of a helicopter in collecting data on Ospreys nesting primarily in trees. We hope this information will benefit other researchers who might consider using a rotary-winged aircraft in conducting similar raptor surveys.

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DUKE AND REDIG RECEIVE PRESTIGIOUS AWARD

Dr. Gary E. Duke and Dr. Patrick Redig, both of the College of Veterinary Medicine, University of Minnesota, received a joint American Motors Conservation Award on November 23, 1976. Presentation was made at the Fall Awards Convocation of the Veterinary College. The citation states in part:

"Duke and Redig are among seventeen men and five women from seventeen states named to receive 1976 Conservation Awards. They have been presented annually since 1954 to professional and nonprofessional conservationists for outstanding contributions in the field of renewable natural resources. Winners receive bronze sculptured medallions and honorariums of $500.

"Dr. Duke, a professor of physiology, and Dr. Redig, a veterinarian, are making a major contribution to understanding and preservation of birds of prey and other large nongame birds through establishment of a unique rehabilitation clinic at the University of Minnesota. They have combined their skills in physiology, surgery, and pharmacology in the treatment of hundreds of sick or injured birds, ranging from eagles to falcons to many other kinds of raptors."

Dr. Duke, of course, is the hard-working Treasurer of the Raptor Research Foundation, and Dr. Redig is an enthusiastic and productive member. Congratulations, Gary and Pat!

Methods

A turbocharged Bell 47G-3B-1 helicopter was used for the surveys. It seats a pilot and two passengers. As a high performance aircraft, the Bell helicopter can maneuver in the difficult situations often encountered in this type of survey.

The study area was divided into two watersheds: Coeur d'Alene and Pend Oreille. Because only one watershed could be flown per day, a complete survey of the nests in the study area required two days. Two surveys were made during the nesting season: one in mid-May to determine clutch size and to count active and occupied nests (activity survey), and a second in mid-July to determine nesting success and to count nestlings (productivity survey). Flights began at midmorning and ended when the watershed was satisfactorily surveyed. Each required approximately four hours of flying time. Tentative flight plans were laid out prior to each flight in order to reduce unnecessary flying. Some in-flight adjustments were necessary owing to refueling needs and unfavorable weather (wind) conditions.

To facilitate maneuverability and control of the helicopter, we approached nests into the wind whenever possible. One observer kept watch on the location of the adult birds while the other observer recorded clutch sizes and nestling numbers. White and Sherrod (1973) advise approaching from upwind as birds flushed into the wind may wing back into the helicopter. We did not experience this problem while approaching from downwind, possibly because the helicopter air speed was practically zero near the nest.

Disturbance

In order to collect certain kinds of data, it is inevitable that nesting Ospreys will be disturbed, whether the survey is conducted from an aircraft or by other means. Fortunately, the Osprey is very tolerant of human disturbance. In 1972, a nest constructed on a railroad bridge crossing the Pend Oreille River was successful, even with trains passing at frequent intervals below (Melquist 1974). Numerous other nests located within 50 m of where hundreds of recreational boats pass during the breeding season are consistently successful. The possibility seems remote that our activity caused nest desertion.

Several pairs had not commenced egg-laying when we flew the activity survey, yet they were quite aggressive. This period is critical for some species of raptors which will often abandon the nesting attempt if disturbed (Bloom 1974). None of these pairs abandoned their nests.

When approaching an Osprey nest, we have always observed that the incubating birds stand up before flying from the nest (fig. 2). Because of this behavior and the depth of the nest bowl, it is highly unlikely that eggs would be dragged from the nest during hasty departures. However, the observation of a nest containing three eggs, where one egg was situated at the edge of the nest, suggests that eggs can be and are displaced at times.

Osprey nests are normally located so that it is difficult to surprise the birds by a sudden appearance. The approaching aircraft is usually detected by nesting birds long before they become alarmed. Under these circumstances, there is little chance that the incubating bird will puncture or break an egg when leaving the nest.

Both surveys were made during favorable weather conditions. This procedure is important to the welfare of the passengers, as well as decreasing the possibility of eggs being chilled or nestlings suffering heat prostration. The short period of time that the adults were kept from the nest (usually under one minute) had no apparent detrimental effect on the nesting effort.

The second survey was conducted when nestlings were near fledging age. This check was to determine productivity: number of young fledged per active and occupied nest. The flight

was made when most nestlings were near fledging age in order to reduce the possibility of nestling mortality following our count. Even with the nestlings almost fully grown, the approach of the helicopter and alarm call from the adults resulted in the typical response of the young's lying motionless in the nest. As a result, we did not cause premature fledging at any nest. At this age, should the nestlings stand up and spread their wings in a defense posture–as they normally would do when investigators climb to the nest–there would exist the possibility of blowing them from the nest with the draft created by the rotor.

Reaction of Adults

During the activity survey in May, incubating birds usually flushed when the helicopter approached within 50 m of the nest. Typically they would circle above or to the side of the helicopter. Occasionally an Osprey (usually the female) would fly directly toward the helicopter, veering off well in advance of a collision. Most birds returned to the nest immediately after the helicopter departed. When a second approach to the nest was necessary, the birds always managed to keep a safe distance from the rotor. Only twice during the activity survey did a bird appear to be in danger of being struck by the helicopter. One near miss was due to the helicopter's rising in the direction of an undetected bird hovering above. The other occurred when an Osprey rose up from below into the flight path. A quick maneuver by the pilot prevented a collision in each case.

On several occasions, incubating birds exhibited a great deal of nest tenacity. Several could not be flushed off of the eggs, despite a close approach, and vigorous, noisy tactics. As a result, clutch-size data could not be obtained from these nests. "Prop wash" had no effect on the nest structure and did not disturb the eggs.

White and Sherrod (1973) state that Peregrine Falcons (*Falco peregrinus*), Bald Eagles (*Haliaeetus laucocophalus*), and Gyrfalcons (*Falco rusticolus*) have been noted to attack helicopters. According to Don Jenni (pers. comm.), Ospreys were prone to attack a helicopter during a survey along the Clearwater River in north central Idaho. Our experience suggests that adult Ospreys are most aggressive during the time nestlings are very young. As nestlings mature, the adults become less aggressive. Since the productivity survey was conducted when most nestlings were quite large, the only problems with aggressive parents occurred at sites where the birds either nested late or renested, and the nestlings were still quite young.

Visibility of Eggs and Nestlings

Determination of clutch size was relatively easy since most eggs were readily visible through binoculars or with the naked eye. Heavily pigmented eggs occasionally made determination of clutch size more difficult (fig. 3). Because of the helicopter vibrations, egg counting was often easier without binoculars.

Nestlings were more difficult to count because of the cryptic coloration of juvenile plumage. Nestlings respond to the adult's alarm call by lying motionless in the nest. Young birds less than five weeks of age were the easiest to see since the white down feathers of the spinal tract were easily visible (fig. 4). As the birds grow older, cryptic contour feathers made them more difficult to see.

Costs

Helicopter rental is quite costly. However, the reduction in time, greater validity of data, as well as increased quantity of data acquired offset this cost. Approximately 16 hours of flying time were required to complete both the activity and productivity surveys (less time if clutch size is not desired). In order to conduct the same surveys by foot, boat and vehicle, at

least 28 man days and 8,000 vehicle miles would have been necessary, and less data would have been obtained. We believe the use of an aircraft is, therefore, easily justified (see table 1).

Validity of Data

The use of a helicopter provides a means of obtaining a larger sample size and also increases the precision of the data. With the helicopter we were able to collect data normally unavailable by previous methods. Clutch size data for all but a few nests are impossible to obtain without an aircraft, because of the extreme height of most nest structures and depth of the nest bowl. Without clutch size data, hatching success cannot be determined.

Nestling counts are time consuming without an aircraft (Johnson and Melquist 1973). If the adult birds are alarmed by the observer's presence, the nestlings respond by lying motionless in the nest and cannot be seen. In the past, as much as one hour was required at a single nest to successfully count all the nestlings. Additionally, nestlings that hatched late were even more difficult to see. Repeat trips to such nests must then be made if good reproductive data are to be collected.

Conclusions

The use of a helicopter for collecting Osprey reproductive data provides reliable data and safety to nesting birds and their young. In addition, it is usually less expensive than other sampling methods. No indications of reduced productivity due to nest desertion, disturbance, damage to eggs and/or nest, or increased predation occurred as a result of its use. Productivity levels were essentially equivalent to those of past years. Clutch size for 117 nests averaged 2.79 eggs per nest. In 1972 and 1973, clutch size for 29 nests was 2.80 eggs per nest (Melquist 1974). The use of a helicopter has, therefore, substantiated data previously collected by normally less effective methods. Finally, the use of a helicopter has allowed us to collect these data over a shorter period of time, thus increasing the accuracy of the results.

Recommendations

Low-power binoculars (less than 7X) are recommended for use in helicopter surveys to minimize the effects of vibration.

Observation of eggs and nestlings is easier with the doors off the helicopter.

To minimize the possibility of egg and nestling mortality from exposure, flights should be avoided during inclement weather.

Flights should be made during times of reduced wind (usually in the morning). Because of turbulent air conditions in late morning and early afternoon, close observation of certain nests may be impossible.

Although we did not experience any problems, discretion should be used when approaching occupied nests where egg-laying has not commenced, in order to avoid possible nest abandonment.

To further reduce costs, a fixed-wing aircraft could be used to determine nest activity during the mid-May activity survey. A helicopter would be necessary for those surveys where clutch size and hatching success data are essential. The cost of a fixed-wing aircraft is approximately 25-35 percent of that of a helicopter, and the greater air speed of fixed-wing aircraft would be advantageous for extensive surveys. Incubating Ospreys are rather easily detected on the nest, even at elevations of 50-75 m; thus, disturbance to nesting birds by fixed-wing aircraft would be minimized. We believe, however, that nestling counts cannot be made with reliability from a fixed-wing aircraft.

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Table 1. Cost comparison of Osprey activity and productivity surveys: 1974 and 1975.

1974 estimated costs–vehicle, boat, foot survey	
Man days–1 observer for 28 days @ $52.50 per day	$1,470.00
Vehicle mileage–8000 miles @ .15 per mile	1,200.00
Boat rental–10 hours @ estimated $5.00 per hour	50.00
Subsistence–Lodging and meals for 10 field days	250.00
Total	$2,970.00
1975 actual costs–helicopter surveys	
Man days–2 observers for 4 man days each @ $63.00 per man day	$ 504.00
Helicopter costs–Approximately 16 hrs. @ $145.00	2,320.00
Subsistence–No cost	– –
Total	$2,824.00

Figure 1. Osprey nest in cottonwood snag on St. Joe River, Idaho.

Figure 2. Incubating Osprey standing at nest edge as helicopter approaches.